

AMENDMENTS TO THE CLAIMS

Claims 1-57 are pending, of which claims 16-20, 27-34, and 42-56 are withdrawn from consideration.

Claims 8, 28-34 and 46-54 are being canceled without prejudice or disclaimer. Claims 1, 2, 9, 14-16, 21, 22, 27, 35, 36, 42, 43, 55, and 57 are being amended. New claims 58-63 are being added.

After the amendments, claims 1-7, 9-27, 35-45 and 55-63 will be pending. Claims 1-7, 9-15, 21-26, 35-41 and 57-63 will be under examination.

This listing of claims replaces all prior versions and listings of claims in the application:

Listing of Claims:

1. (Currently amended) A synthetic peptide of [[the]] formula I:



wherein

[[A]] a is Ile, Leu, or Val ~~or a derivative thereof~~;

[[D]] d is Leu, Ile, or Val ~~or a derivative thereof~~;

each X is an amino acid residue ~~or derivative thereof~~ which corresponds to an amino acid residue of an epitope of a native coiled-coil protein;

the X residues in each (~~A~~X~~X~~D~~X~~X~~X~~a~~X~~X~~d~~X~~X~~X) repeat form a set of X residues; [[and]] n is equal to or greater than 1; and
the peptide optionally comprises additional amino acids on either or both sides of the formula I, wherein the number of said additional amino acids on either side is less than 30.

2. (Currently amended) The peptide of claim 1 wherein $[[A]]$ a is Ile and $[[D]]$ d is Leu in every (~~AXXDXXX~~aXXdXXX) repeat.
3. (Original) The peptide of claim 1 wherein n is about 3 to 6.
4. (Original) The peptide of claim 1 wherein said X residues are amino acids that are solvent exposed in an coiled-coil region of the native protein.
5. (Original) The peptide of claim 1 wherein each of said sets of X residues is from the same epitope of a single protein.
6. (Original) The peptide of claim 1 which contains at least two different sets of X residues.
7. (Original) The peptide of claim 6 wherein each of said different sets is independently selected from the group consisting of different epitopes of the same protein and epitopes from different proteins.
8. (Canceled)
9. (Currently amended) The peptide of claim $[[8]]$ 1 wherein said additional amino acid residues are Cys-Nle-Gly at the N-terminus of the peptide.
10. (Original) The peptide of claim 1 wherein the set of X residues correspond to a consensus sequence of solvent exposed residues of native coiled-coil proteins.
11. (Original) The peptide of claim 10 wherein the coiled-coil proteins are selected from the group consisting of Pneumococcal surface protein A, Pneumococcal surface protein C, and Pneumococcal adhesin A.

12. (Previously presented) The peptide of claim 11 wherein the peptide comprises an amino acid sequence selected from the group consisting of Glu-Glu-Leu-X₁-X₂-Lys-Ile-Asp-Glu-Leu-Asp-X₃-Glu-Ile-Ala-X₄-Leu-Glu-Lys-X₅ (SEQ ID NO: 5) and Glu-Glu-Leu-X₁-X₂-Lys-Ile-Asp-Glu-Leu-Asp (1-11 of SEQ ID NO: 5), wherein X₁, X₂, X₃, X₄ or X₅ is any amino acid.
13. (Previously presented) The peptide of claim 12 wherein
X₁ is Ser, Gln, Asn or Asp,
X₂ is Asp, Asn or Lys;
X₃ is Ala or Asn;
X₄ is Lys, Glu or Asp; and
X₅ is Asn, Asp or Glu.

14. (Currently amended) A synthetic peptide of [[the]] formula I:



wherein

[[A]] a is Ile, Leu, or Val ~~or a derivative thereof~~;

[[D]] d is Leu, Ile, or Val ~~or a derivative thereof~~;

each X is an amino acid residue ~~or derivative thereof~~ which corresponds to an amino acid residue of an epitope of a native coiled-coil protein, except at least one X is replaced with a charged amino acid residue in a manner which allows a salt bridge to form between the charged amino acid and another amino acid residue of an opposite charge, which salt bridge facilitates the peptide to assume a coiled-coil structure;

the X residues in each (AXXDXXXaXXdXXX) repeat form a set of X residues; [[and]]

n is equal to or greater than 1; and

the peptide optionally comprises additional amino acids on either or both sides of the formula I, wherein the number of said additional amino acids on either side is less than 30.

15. (Currently amended) ~~[[A]]~~ The peptide of claim 14 wherein the charged amino acid is selected from the group consisting of Asp, Glu, Lys, Arg and His.
16. (Withdrawn) A method of making ~~[[a]]~~ the peptide of ~~the formula I~~ claim 1 comprising:
 - a) selecting an epitope of a coiled-coil protein;
 - b) determining which amino acid residues of said epitope are solvent exposed; and
 - c) inserting said solvent exposed amino acid residues into the X positions of formula I.
17. (Withdrawn) The method of claim 16 wherein the coiled-coil protein is a microbial protein.
18. (Withdrawn) The method of claim 16 wherein the selection of epitopes is performed using a computer algorithm.
19. (Withdrawn) The method of claim 16 wherein more than one set of epitopic amino acids is used.
20. (Withdrawn) The method of claim 19 wherein each of said sets is independently selected from the group consisting of different epitopes of the same protein and epitopes from different proteins.
21. (Currently amended) A composition useful to stimulate an immune response in an animal, said composition comprising at least one peptide of claim 1 ~~formula I~~.
22. (Currently amended) The composition of claim 21 wherein the peptide ~~of formula I~~ is conjugated to a carrier protein.
23. (Original) The composition of claim 21 further comprising an adjuvant.

24. (Original) The composition of claim 21 which contains at least two different sets of X residues.
25. (Original) The composition of claim 24 wherein each of said different sets is independently selected from the group consisting of different epitopes of the same protein and epitopes from different proteins.
26. (Original) The composition of claim 24 which is useful to stimulate an immune response to more than one strain and/or species of microorganism.
27. (Withdrawn) A method of eliciting an immune response in an animal, comprising administering [[a]] the peptide of ~~the formula I~~ claim 1 to said animal.
- 28.-34. (Canceled)
35. (Currently amended) A composition useful as a vaccine, wherein said composition comprises [[a]] the peptide of ~~formula I~~ claim 1.
36. (Currently amended) The composition of claim 35 wherein more than one set of epitopic amino acids is used in the peptide ~~of formula I~~.
37. (Original) The composition of claim 36 wherein the sets of epitopic amino acids are from different strains and/or species of microorganism.
38. (Original) The composition of claim 35 which provides cross protection to more than one strain and/or species of microorganism.
39. (Original) The composition of claim 36 which provides cross protection to more than one strain and/or species of microorganism.

40. (Original) The composition of claim 37 which provides cross protection to more than one strain and/or species of microorganism.
41. (Original) The composition of claim 35 which further comprises a pharmaceutically acceptable excipient or carrier.
42. (Currently amended) A method of preventing a microbial infection comprising administering to a mammal susceptible to said infection ~~[[a]] the peptide of formula I~~ claim 1.
43. (Currently amended) The method of claim 42 wherein more than one set of epitopic amino acids is used in the peptide ~~of formula I~~ and the sets of epitopic amino acids are from different strains and/or species of microorganism.
44. (Withdrawn) The method of claim 42 which is useful to prevent infection by several strains and/or species of microorganism.
45. (Withdrawn) The method of claim 43 which is useful to prevent infection by several strains and/or species of microorganism.
- 46.-54. (Canceled)
55. (Currently amended) A method for determining the presence of antibodies to a microbial protein in a biological sample, comprising:
 - a) contacting said biological sample with ~~[[a]] the peptide of formula I~~ claim 1, which peptide comprises at least one epitope from said microbial protein; and
 - b) determining whether antibodies in said biological sample bind to said peptide.
56. (Withdrawn) The method of claim 55 which is used to determine prior exposure of an animal to a particular microorganism.

57. (Currently amended) The ~~protein~~ peptide of claim [[8]] 1 wherein the additional amino acids stabilize the peptide through the formation of lactam bridges.
58. (New) The peptide of claim 1 that is helical in benign buffer.
59. (New) The peptide of claim 1 comprising at least two different sets of X residues that are derived from different strains and/or species of microorganism.
60. (New) A synthetic peptide of formula I:



wherein

a is Ile, Leu, or Val;

d is Leu, Ile, or Val;

each X is an amino acid residue which corresponds to an amino acid residue of an epitope of a native coiled-coil protein;

the X residues in each (*aXXdXXX*) repeat form a set of X residues;

n is equal to or greater than 1;

the (*aXXdXXX*)_{*n*} sequence does not exist in nature; and

the peptide optionally comprises additional amino acids on either or both sides of the formula I

61. (New) The peptide of claim 61 that is helical in benign buffer.
62. (New) The peptide of claim 61 comprising at least two different sets of X residues that are derived from different strains and/or species of microorganism.
63. (New) The composition of claim 24 wherein the different sets of X residues are in the same peptide.